

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In the Matter of)	
)	
Revision of Part 15 of the Commission's)	
Rules to Permit Unlicensed National)	
Information Infrastructure (U-NII))	ET Docket No, 13-49
Devices in the 5 GHz Band)	

COMMENTS OF THE INFORMATION TECHNOLOGY INDUSTRY COUNCIL

May 28, 2013

The Information Technology Industry Council (ITI) hereby files the comments in response to the Notice of Proposed Rulemaking in the above-captioned proceeding.¹

ITI represents 52 of the nation's leading information and communications technology companies. ² ITI is the voice of the high-tech community, advocating for policies that advance U.S. leadership in technology, promote innovation, open access to new and emerging markets, protect and enhance consumer choice, and foster increased global competition. ITI's member companies include wireless and wireline network equipment providers, computer hardware and software companies, Internet and cloud services, and network security providers.

¹ Revision of Part 15 of the Commission's Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band, ET Docket No. 13-49 (Rel. February 20, 2013).

² For more information on ITI, including a list of its member companies, please visit: <http://www.itic.org/about/member-companies.dot>.

I. INTRODUCTION AND SUMMARY

Consistent with ITI's prior support for the Middle Class Tax Relief and Job Creation Act³, and the Spectrum for Innovation Act,⁴ ITI is encouraged by the FCC's efforts to facilitate greater access to the 5 GHz band for Unlicensed National Information Infrastructure (U-NII) devices.⁵ Making this spectrum available in the marketplace expeditiously will stimulate investment and innovation, and is another step toward meeting our nation's spectrum demands. It is imperative that Congress, the Commission, and relevant federal agencies continue working together in a collaborative fashion to meet the spectrum needs of this country.

II. WI-FI HAS EXPERIENCED EXPONENTIAL GROWTH THROUGHOUT ITS HISTORY.

Wi-Fi technology has historically been integrated in electronic products such as personal computers and printers, but products such as smart phones, tablets, smart TVs, and other consumer electronics that are increasing in features and functionality are driving new, heavy growth. According to some market estimates, global Wi-Fi chip shipments will grow from approximately 1.6 billion units in 2012 to approximately 3.5 billion units in 2017. That equates to a compound annual growth rate of 16.6%.⁶ The amount of traffic offloaded from smartphones to Wi-Fi and local networks will be 46 percent in 2017, and the amount of traffic offloaded

³ Public Law No: 112-96.

⁴ H.R. 2520, introduced by Representative Doris Matsui; July 13, 2011; 112th Congress.

⁵ This should include, but not be limited to, new IEEE 802.11ac.

⁶ ABI Research, February 2013 report.

from tablets will be 71 percent in 2017.⁷ By 2016, as much as 60 percent of all mobile network traffic could be carried over Wi-Fi and small cell networks.⁸ Additional projections indicate that by 2017 mobile data traffic will reach 11.2 exabytes per month, while mobile data traffic that is offloaded via Wi-Fi and femtocell will be nearly double that, reaching 21 exabytes per month.⁹ Indeed, without wireless offload, total mobile data traffic would grow at a projected rate of 74 percent per year until 2017, rather than the forecast 66 percent, placing a much greater burden on already-taxed licensed networks.¹⁰

III. ADDITIONAL UNLICENSED SPECTRUM AT 5 GHZ WILL ENHANCE THE BENEFITS CONSUMERS ARE ALREADY EXPERIENCING FROM WI-FI AND OTHER UNLICENSED TECHNOLOGIES.

a. WI-FI AND OTHER UNLICENSED TECHNOLOGIES ARE PROVIDING SIGNIFICANT BENEFITS TO CONSUMERS TODAY.

Wi-Fi currently offers a variety of benefits to consumers, including ubiquitous, nomadic Internet access in homes and retail establishments, and is increasingly being used for cellular offloading. Economist Richard Thanki estimates the extension of fixed broadband networks by use of unlicensed spectrum generates \$15.5 billion of consumer surplus in the United States every year.¹¹

⁷ Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2012–2017, Executive Summary, (CVNI Summary).

⁸ Mobile Data Offload & Onload: WiFi & Small Cell Strategies 2012-2016; Juniper Research.

⁹ CVNI Summary.

¹⁰ CVNI Summary.

¹¹ Richard Thanki, The Economic Significance of Licence-Exempt Spectrum to the Future of the Internet, at 35 (June 2012).

Wi-Fi also allows multiple devices to share a single connection. For example, a Wi-Fi router in the home distributes the signal to multiple devices, which allows a parent to work on one computer or device, while the kids do their homework on another. Wi-Fi also provides an alternative mechanism for the transmission of online video.

Access to Wi-Fi also allows mobile carriers to offload traffic from congested networks, lowering their costs and expanding their service offerings. While Wi-Fi access alone will not solve the spectrum shortage, it can be an important element of the overall solution to alleviate congestion.

b. NEXT-GENERATION WI-FI WILL SIGNIFICANTLY ENHANCE THE BENEFITS TO THE CONSUMER.

With the introduction of next generation Institute of Electrical and Electronics Engineers (IEEE) 802.11ac Wi-Fi technology, consumers stand to benefit greatly from device-to-device connectivity, including speeds five times greater than those provided by today's 802.11n Wi-Fi technology. This next generation Wi-Fi technology enables new usage models in enterprise, home, and public access usage such as wireless displays and faster high-speed file transfers, among other uses. For consumers, 802.11ac also facilitates use of Wi-Fi technology enhancements to deliver higher data rates. This is important given the increased data rates that consumers have coming into the residence with deployment of fiber to the home, as well as increased cable modem and DSL data rates.

Final ratification of the IEEE 802.11ac standard is expected in February 2014.¹² IEEE 802.11ac, although not finalized, is sufficiently stable such that some manufacturers have already begun producing chips. The Wi-Fi Alliance is expected to begin certifying products in the first half of this year. Wi-Fi Alliance certification represents an important step as it denotes the interoperability of devices from different vendors based upon robust testing.

Initial products incorporating this new Wi-Fi technology have started appearing on the market, with volume shipments expected later this year. The full benefit of this technology, however, cannot currently be realized due to the limited contiguous 5 GHz spectrum available for use by Wi-Fi.

IV. THERE IS A UNIQUE IMPORTANCE FOR PROVIDING ADDITIONAL U-NII AT 5 GHZ.

There are several reasons that the 5 GHz band is well suited for additional unlicensed spectrum. Wide band channels are necessary to support high throughput requirements. The IEEE 802.11ac standard, for example, utilizes 80 MHz and 160 MHz wide channels. Those wide channel sizes, along with other technical enhancements, provide Gigabit per second level data rates. Today, 5 GHz spectrum allocation is a limiting factor in the deployment of the technology. Current U-NII spectrum allows only four 80 MHz channels and one 160 MHz channel, with the Terminal Doppler Weather Radar (TDWR) band exclusion.

Additional unlicensed use at 5.35-5.47 GHz and 5.85-5.925 GHz, as well as reopening of the TDWR band would greatly increase the capabilities in this

¹² http://www.ieee802.org/11/Reports/802.11_Timelines.htm.

spectrum. It would more than double the 80 MHz channels to nine total, and allow for four 160 MHz channels. This increase in channels is greater than the corresponding increase in spectrum, as the contiguous spectrum allows the implementation of a far more efficient band plan.¹³



A large number of non-overlapping channels is necessary to support high quality of service requirements. They are also necessary to avoid co-channel interference. Based on the above, it is not only important to have additional new spectrum, but it is equally important to reopen the TDWR band. Furthermore, since Wi-Fi devices already operate in spectrum immediately adjacent to the 5350-5470 and 5850-5925 MHz bands, allowing Wi-Fi in the proposed new bands would be relatively easy for companies to implement quickly in terms of equipment cost and complexity.

V. ALLOWING 802.11AC AT 5 GHZ WILL PROVIDE ADDITIONAL CONSUMER USE CASES.

a. ADDITIONAL HIGH-SPEED APPLICATIONS WILL BE AVAILABLE FOR USE IN THE HOME AND OFFICE.

Freeing up additional spectrum in the 5 GHz band, along with advances in technology, will enable many new applications and improve others. Wider

¹³ More channels are created than the number of megahertz of spectrum opened due to the efficiencies created by availability to larger bands.

channels in the 5 GHz band will create significantly more robust Wi-Fi networks, and enable the transfer of multiple streams of very high-speed data among consumer devices. For example, consumers will be able to directly connect (i.e., without the need for routing through the access point) laptops, cameras, HD TVs, external hard drives, etc. This will allow consumers to stream movies directly from a PC, tablet, or similar devices to an HD TV, download photos from a digital camera to a computer, and access a central hard drive, simultaneously, seamlessly, and wirelessly. In an office or home-office set-up it would allow users to connect their PC to peripheral devices such as printers, external displays, keyboards, and computer mice, wirelessly. To give another example, remote medical assistance will offer sufficient data throughput to provide higher resolution video conferencing to consult a physician while simultaneously allowing the physician to review digital images such as X-rays.

b. INCREASING UNLICENSED PERMISSIONS AT 5 GHZ WILL PROVIDE GREATER PUBLIC ACCESS.

Wi-Fi hotspots throughout the country provide nomadic Internet access to consumers in a wide range of settings. Consumers are able to access the Internet to perform activities such as sending/receiving email, video chat, access work or personal files, and view websites. Additional 5 GHz spectrum will greatly increase the usefulness of hotspots, making them faster and more reliable.

Cellular carrier offloading will also be enhanced, providing mobile service providers an option for moving traffic off their cellular network. This benefits consumers as well, by providing an alternative Internet connection through a network that may have fewer users or be less congested.

VI. THE TECH INDUSTRY IS OPTIMISTIC THAT SUCCESSFUL SHARING IS POSSIBLE IN THE 5.35-5.47 GHZ AND 5.85-5.925 BANDS.

Spectrum sharing already is occurring at 5 GHz. Wi-Fi devices, for example, today successfully share the 5.25-5.35 and 5.470-5.725 GHz bands with the primary users of the spectrum, including a wide range of classified military radars operating on land, on board ships in coastal areas, on airplanes, and on spacecraft. Techniques to detect and avoid these systems have been developed despite extremely challenging technical conditions; these military radars often use frequency hopping techniques designed to avoid detection and interference. Furthermore, due to national security considerations, the details of these radars are classified.

ITI's members are confident that sharing techniques can be developed to protect the primary users in the 5 GHz band while enabling expanded unlicensed use. Dedicated short-range communications (DSRC) and Wi-Fi are uniquely positioned to share the U-NII-4 spectrum—they are both based on the IEEE 802.11 standard, so there is good reason to believe that a mutually acceptable sharing mechanism can be developed. Protecting primary services in the 5350-5470 MHz band,¹⁴ many of which also operate in 5470-5725 MHz, where Dynamic Frequency Selection (DFS) has already been employed to protect incumbent services, should allow for the expeditious development of similar protection techniques. Industry also expects that measures to protect other incumbent services in the 5850-5925 MHz band (Fixed and Fixed Satellite Services) can be developed/implemented.

¹⁴ Specifically, Earth Exploration-Satellite (active), Radiolocation, Aeronautical Radionavigation, Space Research (active), and Radionavigation.

Consistent with prior filings, ITI is neutral regarding what specific sharing technology should be used. We continue to support regulatory flexibility that lets the market decide.

Industry strongly supports prompt commencement and completion by NTIA of sharing studies in both expansion bands, and stand ready to participate in the process. ITI believes the following steps should be taken to maximize use of the spectrum in the given ranges:

- a. 5.35-5.47 GHz: Industry supports all technical due diligence to ensure that incumbents' services in the proposed new bands are protected and U-NII devices can operate.
- b. 5.85-5.925 GHz: Industry supports engaging in technical discussions with the ITS community to evaluate sharing the U-NNI-4 spectrum between planned DSRC deployments and U-NII devices.
- c. 5.85-5.925 GHz: Industry also supports development of measures to protect other incumbent systems already deployed in the band, i.e. Fixed and Fixed Satellite Services.

In addition to opening the new bands, industry supports specific proposed rule changes that would improve operations in 5 GHz by harmonizing power levels and allowing outdoor use, to the extent reasonably practicable. Specifically, ITI supports harmonization of rules across UNII bands where possible, including raising power levels where possible and removing limitations on outdoor use. The Commission should also seek methods that protect FAA weather radar (TDWR) from high power, outdoor devices, while allowing Wi-Fi devices to use the 5600-5650 MHz band again. We encourage the FCC to act expeditiously to propose specific mechanisms to protect TDWRs from interfering devices, and re-open the 5600-5650 MHz band. Action should also be taken to provide clarification of the

UNII-3 and Part 15.247 rules to allow seamless operation across the upper UNII bands.

Lastly, there should be modification of UNII rules to better address new use cases. In particular, indoor requirement in U-NII-1 band has adversely impacted applications such as Wi-Fi Direct and Miracast, and we therefore recommend removal of indoor requirement for low power Wi-Fi devices in this band. Also, requiring DFS for low-power Wi-Fi devices in U-NII-2A and U-NII-2C bands not only burdens these devices with additional cost, but it also limits enabling new and innovative next generation Wi-Fi applications that could be deployed consistent with protection of incumbents, using other interference-avoidance solutions.

VII. CONCLUSION

ITI welcomes the opportunity to provide comments in this proceeding. The 5 GHz band offers an enormous opportunity to take steps toward meeting our nation's spectrum needs, fostering new investment and innovation in next generation Wi-Fi, and offering many significant benefits for consumers.

Respectfully Submitted,

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